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Declaration under Rule 4.17:
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(54) Title: SYSTEM FOR DEBITING AND CLEARING OF VEHICLE PARKING FEES

(57) Abstract: A cellular system for mobile telecommunication comprising mobile terminals than can use the Wireless Application Protocol (WAP) to access a network server and whose identifies and actual zone of location, determined by the Cell of Origin (COO) or a more precocious mobile positioning system, can be added by the mobile network during such access and that a user of said mobile terminals during said access can request a specific parking application that will respond with names and parking tariffs for those streets, or street blocks, and car parks that are fully or partly contained within said zone of location and that said user then can select such a street or car park with its corresponding parking tariff and for a stated vehicle license plate number start a new, or stop an ongoing, parking fee registration on a specific account belonging to said identify.

WO 02/15130 A1

TITLE

System for Debiting and Clearing of Vehicle Parking Fees

FIELD OF THE INVENTION

5   The present invention relates to a system for debiting and clearing of parking fees according to the introduction in claim 1.

BACKGROUND OF THE INVENTION

Several international patent applications describe how parking fees can be
10   debited through some mobile telephone network. The International Patent Application WO 9627170, WO 9611453 and WO 93200539 all describe how a mobile phone could be used from the vehicle to inform a centre about the actual parking zone. The drawback with this arrangement is that all parking zones will require unique codes shown on some signpost within the parking
15   area.

The International Patent Application WO 9910844 takes this a step further by the use of cell location information for the actual mobile phone, which then require much simpler sign codes. Major drawbacks with this
20   arrangement are the use of general broadcast messages and specially arranged and coded signposts. This will limit the arrangement to networks with broadcast possibilities and parking areas with such specially installed signposts. The instalment of signposts will also require a critical mass of potential users that may be hard to reach with the few mobile operators that
25   is likely to implement broadcast services. Another drawback is that the concept of general broadcast messages will prevent the use of individual location information that now are offered within several mobile networks.

Consequently there is a need for a more general system for efficient debiting
30   and clearing of parking fees, supported by mobile phones, that is not limited to certain types of mobile networks and that is not requiring a new

infrastructure of signposts.

SUMMARY OF THE INVENTION

The object mentioned will be obtained by a system according to the present
5   Invention, which characteristics is made clear by the subsequent claim 1.

A system for debiting and clearing of parking fees that may use mobile
phones and the Wireless Application Protocol (WAP) to access a special
Internet application with request for parking. In the WAP Gateway such
10   request may be combined with the actual Mobile Positioning Service (MPS),
used by that subscriber, to specify the parking zone of interest. For this
specific zone the application may reply with name and parking tariff for each
contained street, or street block, and car park, from which the user may
select according to the actual parking location. The start and stop of such
15   parking may be registered on the account for respectively subscriber and
parking operator for later clearing. The parking check may also be fully
supported by the system.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS
20   In the following the invention shall be described.

The Wireless Application Protocol (WAP) incorporates a relatively simple
micro-browser into the mobile phone and could use any existing or planned
wireless service such as Short Message Service (SMS), Unstructured
25   Supplementary Services Data (USSD) and General Packet Radio Service
(GPRS). WAP could also be used in any mobile network standard such as
Code Division Multiple Access (CDMA), Global System for Mobile
Communication (GSM) or Universal Mobile Telephone System (UMTS).

30   These features make WAP very suitable for accessing value-added services
and applications that reside temporarily on Internet servers and not

permanently in the mobile phones themselves.

To access the Internet using WAP a request is made in Wireless Markup Language (WML), a language derived from Hyper Text Markup Language (HTML) especially for wireless network characteristics. This request is passed to a WAP Gateway that then retrieves the information from an Internet server either in standard HTML format or preferably directly prepared for wireless terminals using WML. If the content being retrieved is in HTML format, a filter in the WAP Gateway may try to translate it into WML. The requested information is then sent from the WAP Gateway to the WAP client, using whatever mobile network bearer service is available and most appropriate.

If the WAP Gateway when receiving a WML request also is interfaced with subscriber location data, retrieved from the wireless network, then it can dynamically customise such WML pages for a certain users. This may allow a certain WML request to be combined with the actual Mobile Positioning Service (MPS) used by that subscriber. Such services could be based on different methods like Cell of Origin (COO), Time of Arrival (TOA), Time Difference of Arrival (TDOA), Angle of Arrival (AOA), Global Positioning System (GPS) and others. For the user each of these methods will specify zones of uncertainty with different size in terms of geographical co-ordinates and specific geometrical shapes. The COO service will specify the largest one while the GPS service normally will specify the smallest zone of uncertainty. The COO service is also available in all cellular networks and for all cellular phones. The other types of positioning services may depend on the actual network and/or the mobile phone.

Using said system technologies to access the Internet Parking Application (IPA) described below it would be possible to provide the following debiting and clearing services to virtually all WAP subscribers:

The IPA provides debiting and clearing services, related to parking fees for on-street and off-street parking, between registered WAP subscribers and parking operators. When registering, the WAP subscriber will state his or her International Mobile Subscription Identity (IMSI), license plate number for preferred vehicle(s) and a maximum time limit for a single parking. In case the clearing should be done by other means than over the mobile phone bill the subscriber will have to add such information needed. The registration could be done using an Internet or WAP terminal or even at a manual call centre. Once the mobile network operator has accepted such registration then the IPA will be opened to the WAP subscriber. The subscriber will then also receive stickers, to attach to the car(s), with a bar code corresponding to the IMSI as well as a personal code for viewing the subscriber IPA account.

The debiting procedure is based on a map database, covering all IPA related areas, containing streets and car parks with corresponding names, parking tariffs and parking operators. When parking the car the subscriber uses the WAP terminal to access the IPA with a request for on-street or off-street parking. When passing the WAP Gateway the IMSI and the actual zone, given by the MPS for that subscriber, will be added to this request. The IMSI will define the subscriber IPA account and the zone will be map matched to determine all streets or car parks that fully or partly are contained in this zone.

After a request for on-street parking the IPA will reply with information about the highest on-street parking tariff at any time in the requested zone, the registered license plate number and the registered time limit. Once the user accept this information the IPA start to register the parking. Before accepting the user may change to another license plate number or eventually change the time limit. If the highest tariff is not accepted then the IPA instead will

reply with a list of all streets, or street blocks, and corresponding parking tariffs contained in the zone. From this list the user may select the actual street or street block. When the selection is done the user will be shown the corresponding parking tariff including related conditions like tariff variation over time and eventual total fee limits. If the user accept this parking tariff then the IPA start to register the parking.

After a request for off-street parking the IPA will reply with information about the registered license plate number and the registered time limit followed by a list of all car parks and corresponding parking tariffs contained in the zone. From this list the user may select the actual car park. When the selection is done the user will be shown the corresponding parking tariff including related conditions like hours of validity and eventual total fee limits. If the user accept this parking tariff then the IPA start to register the parking.

With the described method subscribers using a less precious MPS will normally need more information and a more tedious selection procedure than those using a high precious MPS. However in case of street parking the user may avoid this delay by selecting the highest on-street parking tariff in the zone determined by the MPS. This will shorten the selection procedure since no street name need to be selected. Still a more precious MPS will decrease the probability for a high difference between the highest and lowest on-street parking tariff in the actual zone. The parking tariffs may be varied over time and the resulting parking fee may also be limited to a fixed amount after a certain time. All this will be automatically handled by the IPA which guarantee the lowest possible parking fee.

To stop the parking the subscriber uses the WAP terminal to access the IPA with such a request. When passing the WAP Gateway only the IMSI will be added to this request. The IMSI will define the subscriber IPA account in which a registered parking should be stopped and to which the resulting fee

should be added. After this request the IPA will reply with information about the registered license plate number and the actual parking fee. If the user accept this then the IPA stops the parking and add the resulting parking fee to subscriber IPA account. Eventually the user may have two different
5   ongoing parking and therefore need to change the license plate number before accepting to stop.

All cars using the IPA should be fitted with a visible sticker with a bar code corresponding to the users IMSI, to be recognised by the parking attendant
10   and identified by the IPA. When performing parking check the parking attendant uses a WAP terminal, with an attached bar code reader, to access the IPA with a request for checking a certain bar code in a specific zone. When passing the WAP Gateway the parking attendant IMSI and the actual zone, given by the MPS for that IMSI, will be added to this request. The IMSI
15   will define the parking attendant right to check and the bar code will identify which registered subscriber IPA account to check. The IPA will reply with information about the registered license plate number and the registered car park or street or if the subscriber has chosen the highest on-street parking tariff. In case of on-street parking with highest parking tariff selection the IPA
20   will guarantee the validity. In all other cases where the subscriber has selected a specific street or car park the parking attendant must check these names for validity. In case the bar code is hard to read the described checking may also be performed based on the actual license plate number.

25   The IPA clearing service is based upon all parking fee registered on each subscriber IPA account and that same parking fee registered on the respectively parking operator IPA account. A street block or a car park could only have one parking operator but a zone may have different on-street parking operators, for instance at community boarders. Therefore when a
30   user select the highest on-street parking tariff for a zone containing different on-street parking operators, then the IPA will split the parking fee between

the parking operators according to their relative street length within this zone. A clearing towards the WAP subscriber, of the monthly-accumulated parking fee, could preferably take use of the monthly mobile phone bill from the subscribers network operator. The parking fees from the different

5   network operators will then be used for the clearing towards the different parking. operators.

Each IPA account will have a full listing of each parking fee and geographic location, in terms of city and street or car park. Each subscriber and parking

10   operator may also use an Internet or WAP terminal to view such listings on their own IPA account.

The Invention is not limited to the above mentioned performance but can be varied within the scope of the subsequent claims.

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CLAIMS:

1. A cellular system for mobile telecommunication comprising mobile terminals that will use the Wireless Application Protocol (WAP) to access a network server and whose identities and actual zone of location, determined by the Cell of Origin (COO) or a more precocious mobile positioning system, will be added by the mobile network during such access, **characterised in**, that a user of said mobile terminals during said access will request a specific parking application that will respond with names and parking tariffs for those streets, or street blocks, and car parks that are fully or partly contained within said zone of location and that said user then will select such a street or car park with its corresponding parking tariff and for a stated vehicle license plate number start a new, or stop an ongoing, parking fee registration on a specific account belonging to said identity.

2. A system according to claim 1, **characterised in**, that for any said zone of location the said parking application will respond with the highest on-street parking tariff at any time and that said user may select such a tariff instead of selecting a specific street, or street block, with its specific parking tariff.

3. A system according to any of claims 1-2, **characterised in**, that the accumulated parking fees registered on said account belonging to said identity will be debited the subscriber given by this identity and credited those parking operators who are entitled to the parking fee for respectively street, or street zone, and car park.

4. A system according to any of claims 1-3, **characterised in**, that a legitimated user of said mobile terminals during said access will state a specific identity or vehicle license plate number and request the said parking

application that will respond with information about all ongoing parking registered on said account belonging to said specific identity, or registered with said license plate number, showing such license plate number and name of street, or street block, or car park, or if said specific identity has

5   chosen the highest on-street parking tariff .

5.   A system according to any of claims 1-4, **characterised in**, that the said network server is connected to the Internet.

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 01/01647

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: G07C 1/30, G07F 17/24, G07B 15/02, G08G 1/14

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: G07C, G07F, G07B, G08G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-INTERNAL, WPI DATA, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WAP.com-WAP NEWS, Volume, June 2000, Andy Szebeni, "Webraska and Schlumberger plan easy parking" page 1	1
X	US 5910782 A (SCHMITT ET AL), 8 June 1999 (08.06.99), column 3, line 4 - column 4, line 19; column 4, line 36 - line 64, figures 3-5	1
Y		2-5
Y	WO 9910844 A1 (RISING, ROLF), 4 March 1999 (04.03.99), page 4, line 24 - page 5	2-5

X	Further documents are listed in the continuation of Box C.		X	See patent family annex.

* Special categories of cited documents:

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
31 October 2001	01 -11- 2001
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C (Continuation).   DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 9834199 A1 (RISING, ROLF), 6 August 1998 (06.08.98), page 8, line 29 - page 10, line 27	2-5
A	US 5940481 A (ZEITMAN), 17 August 1999 (17.08.99), column 2, line 62 - column 3, line 52	1-5
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				International application No. PCT/SE 01/01647

01/10/01

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